

Chapter 4

SANITARY SEWER

4.0 GENERAL

- 4.0.1 All work performed and materials supplied shall conform to the latest edition of Standard Specification for Sewer and Water Construction in Wisconsin, unless otherwise called for in these specifications. Any additional requirements of the Milwaukee Metropolitan Sewerage District (MMSD) shall also apply.
- 4.0.2 The City requires a full-time inspector on the job site during pipe unloading and on the job site during construction of the sanitary sewer and laterals. The contractor responsible for the construction of the sanitary sewers and laterals is also responsible for notifying the City per the notification policy of the City of Franklin. Contractor shall supply material manufactures and certification sheets prior to construction.

4.1 MANHOLES

- 4.1.1 All manholes shall be built and completed as soon as possible after the sewer main is laid. The chimney shall be a maximum of (one) 1 foot as measured from the base of the casting to the top of the corbel precast section. A minimum of 4 inches of chimney section shall be allowed on manholes.
- 4.1.2 All manhole steps shall conform to the requirements of Section 6.40.1 A or B of the Standard Specifications for Sewer and Water Construction in Wisconsin. First step to be set 8 inches below top of corbel (cone) section.
- 4.1.3 All precast manhole barrel sections shall be rotated to align all manhole steps vertically in the manhole.
- 4.1.4 All manhole frames and covers supplied by the contractor shall be Neenah R-1660 or R1661-2001 or equal with machined horizontal bearing surfaces. Manhole frames and covers installed outside of the street right of way or within 100 year flood plain shall be Neenah R 1916-C2 or equal. Stainless steel bolts shall be furnished with this cover. No vent holes will be allowed in the cover, and a rubber tee gasket seal under the cover is required.
- 4.1.5. All manhole rim elevations shall be finally set after curb and gutter installation to 1/4" below the asphalt binder grade elevation which shall be 2-1/4" lower than the grades as shown on the final paving plans. Ramping of manholes will not be allowed.

- 4.1.6 All chimney joints, including the frame-chimney joint, shall be made with a mixture of 50% PenngROUT non-shrink cementitious grout by IPA Systems, Inc., or an approved equal and 50% type M mortar mixed to an acceptable consistency. The grout shall extend the full width of each grade ring and each joint shall be struck off vertical, even with the inside surface of the chimney.
- All precast manhole barrel joints shall be made with preformed butyl rubber gasket material (i.e. "Easy Stik" or equal). The gasket shall be of the size necessary to fill the annular space of the joint. When temperatures are 50° or less a row of butyl rubber gasket material shall be installed at each of the two horizontal surfaces for each manhole barrel joint.
- 4.1.7 An external sealing band shall be placed at all joints between precast manhole sections, sealing bands shall be MacWrap by Mar-Mac Manufacturing Co., Inc., or an approved equal. Band shall be placed within a formed slot when out drop manholes are required. See Figure No.27.
- 4.1.8 All sanitary sewer manholes shall be constructed with a frame/chimney joint external adapter seal. **The adapter shall be installed prior to the binder course installation.** This seal shall conform to Section 3.5.4.1 (c) of the Standard Specifications for Sewer and Water Construction in Wisconsin. The seal shall be installed in accordance with the manufacturer's recommendations i.e. Adaptor, Inc. or an approved equal. It is intended that the external portion of this seal extended from the frame to the top of the cone as a single piece. The seal shall be installed prior to placement of the stone base material. An authorized representative of the City of Franklin must be present while the contractor installs each seal. Only in special cases and with the approval of the City Engineer may frame chimney joint internal rubber seals (boot types) be used. Seals and installation shall conform to Section 3.5.4.1 (c) of the Standard Specifications for Sewer and Water Construction in Wisconsin.
- 4.1.9 **Reconstructed manhole will require the installation of an external seal. The existing internal seal shall be removed and become property of Sewer and Water Utility.**
- 4.1.10 All backfill material around manholes shall be mechanically compacted in six-inch lifts. Flooding of the areas around the manhole will not be permitted.
- 4.1.11 **All bench troughs shall be extended at ninety degree bends or for tees. See Figure 34.**

4.2 MAINLINE AND LATERALS

- 4.2.1 Sanitary sewer pipe materials for mainline and laterals shall be limited to PVC or concrete, unless specifically approved by the City Engineer in writing. For sewers laid at depths greater than 15 feet, pipe class determination documentation shall be provided to City Engineer. Sanitary sewer pipe test reports must be received and verified prior to the start of any sanitary sewer construction operation.
- 4.2.2 All laterals shall be 6" in diameter and installed at a quarter inch per foot gradient **unless otherwise noted on the approved plans, but in case less than one-eighth of an inch per foot.** A maple heart shall be installed at the end of all laterals, and the top 12" shall be painted orange upon completion of the lateral installation. All laterals with less than 6.0' of cover material shall be insulated with 2' x 8' x 2" thick planks of Styrofoam plastic foam (Dow Chemical Company "Hydrand" or approved equivalent). Place a 12' maple heart at the end of the lateral extending a minimum of 1 foot above grade. The top 1' shall be painted orange.
- 4.2.3 When starting a sewer project, the new incoming line into the existing manhole shall be plugged **and braced**, and this plug shall remain until sewer is accepted by the City Engineer. If a new manhole is constructed over an existing line, the pipe shall not be broken out until the project is completed and the manhole vacuum test has been completed on the structure.
- 4.2.4 Open graded number one stone shall be used to backfill sanitary sewer trenches located in a proposed roadway. Contractor with written permission of City Engineer may use Granular Backfill conforming to Table 37 Sec. 8.43.4 as specified in the Standard Specifications for Sewer and Water Construction in Wisconsin.
- 4.2.5 All trenches located in a roadway shall be compacted to 95% of modified proctor density.
- 4.2.6 Backfill consolidation through the use of flooding of trenches shall require written permission of the City Engineer. The flooding of trenches will not be permitted between October 1 and April 15, or if the air temperature is below 32° or if there is frost in the ground. No flooding of trenches that are located in an off-roadway area that has spoil backfill will be permitted. The use of frozen spoil materials for trench backfill, will not be permitted under any conditions. Hydrant permit required prior to use of city water. Flooding holes shall be installed in a five (5) ft staggered pattern.

- 4.2.7 The trench shall be kept free of visible water during any backfilling or compaction work.
- 4.2.8 Twelve inches of limestone chips shall be required as cover material over the top of pipe. Care shall be taken not to exert undue stress on the pipe during a compaction operation. If the trench is to be mechanically compacted, the initial compacted lift shall be 2'. Each subsequent compacted lift of material shall be 18". The contractor shall use smaller lifts if the required compaction cannot be obtained.
- 4.2.9 Existing manholes that do not have an opening for the new sanitary sewer shall have an opening cored in the existing manhole to accommodate the new sanitary sewer. A trough shall be formed in the existing bench to accept the new pipe.
- 4.2.10 The material used to backfill sanitary sewer mainline, lateral or forcemain trenches located in an existing roadway shall be aggregate slurry backfill conforming to Section 8.43.8 of the Standard Specifications for Sewer and Water Construction in Wisconsin.

4.3 TESTING

It is the intent of this section to confirm that sewer system has been constructed with a minimum amount of infiltration.

- 4.3.1 Leakage test of sanitary sewers shall be completed in accordance with Section 3.7.0 of the Standard Specifications. Sewers must pass a leak test before connection of any lateral.
- 4.3.2 The City of Franklin shall require the closed circuit television inspection of all sanitary sewer mains. Prior to televising, sewer needs to be completely cleaned and manhole benches poured. Also, sewer mains shall receive enough water that flow is observed in downstream manhole(s). This television inspection will precede the paving of roadways. The contractor shall be required to repair all visible damage and leaks in the sanitary sewer mains. This procedure is in addition to any testing required by the Standard Specification and/or MMSD. The cost of the television inspection shall be paid by the contractor or developer. **Video tapes or a DVD of the televising shall be submitted to the inspection firm for review.**
- 4.3.3 All sanitary manholes shall be tested for leakage by the vacuum testing **method**. The testing shall conform to the requirements of Standard Specification for Sewer and Water Construction in Wisconsin as amended at the time of the test. Testing shall conform to procedures and table of test times as indicated in Table No.18.

The **vacuum** testing shall conform to the following:

Isolate the manhole to be tested by plugging the inlet and outlet pipes with an inflatable stopper or other suitable test plugs. The plugs and end stubs shall be securely braced to avoid them from being drawn into the MANHOLE. Plug lift holes with a non-shrink cementitious grout mix.

Vacuum test equipment shall be placed at the top of rim after chimney is built with external seal in place, in accordance with the manufacturer's recommendations. Inflate the seal to 40 psi to affect a seal between the base and the manhole. Run vacuum pump until a vacuum of 10 inches of mercury is obtained.

With vacuum pump shut off and the valve on the vacuum line of the test head closed, measure the time for the vacuum to drop to 9 inches of mercury. The manhole test is acceptable if the time exceeds the values listed in the table below.

If the test fails after three attempts, contractor must pursue a different corrective measure. The City of Franklin will not accept exterior grouting, but will except repair or replacement of defective manhole. Retest until an acceptable test is obtained.

TABLE NO. 18				
MINIMUM TEST TIMES IN SECONDS FOR VARIOUS MANHOLE DIAMETERS				
Depth (ft.)	Diameter (in.)			
	42	48	60	72
8	17	20	26	33
10	21	25	33	41
12	25	30	39	49
14	30	35	45	57
16	34	40	52	67
18	38	45	59	73
20	42	50	65	81
22	46	55	72	89
24	51	59	78	97
26	55	64	85	105
28	59	69	91	113
30	63	74	98	121

VACUUM TESTING
SANITARY MANHOLE
FRANKLIN ENGINEERING DEPT.